

Appl. No. 09/991,209

### **REMARKS**

#### **Status of the Application and Claim Amendments**

With entry of the present amendment, claims 3, 6 – 12, 14, 15, 18, 19, 23, 25, 27 – 33, 75 and 77 – 92 are pending. Claims 3 and 75 have been amended and claims 84 – 92 are new. Claims 1, 2, 4, 5, 13, 16, 17, 20 – 22, 24, 26, 34 – 74 and 76 have been cancelled, without prejudice. Applicants reserve the right to file further continuation and/or divisional applications on the subject matter of any cancelled claim. New matter has not been introduced by the amendment.

Independent claims 3 and 75, as amended, recite that the transgenic plant comprises a polynucleotide which encodes a ferulic acid esterase of SEQ ID NO: 2.

New independent claim 84 is directed to transgenic plants, which are *Festuca*, *Lolium*, *Sorghum*, *Zea*, *Triticum*, *Avena* or *Poa* plants, comprising an expression cassette including a polynucleotide encoding an *Aspergillus* ferulic acid esterase. Claim 84 and those claims dependent thereon (claims 85 – 92) find support in the originally elected claims. These claims are discussed herein below.

#### **Rejection under 35 U.S.C. §112, first paragraph.**

The Examiner has rejected claims 3- 12, 14 -15, 18 –19, 23, 25, 27-33 and 77 - 83 under 35 USC §112, first paragraph as failing to comply with the written description requirement. Applicants respectfully traverse this rejection.

The claims, as amended, recite that the polynucleotide encodes a FAE having SEQ ID NO: 2. As stated by the Examiner, Applicants' specification points to SEQ ID NO: 1 encoding an FAE1 amino acid sequence of SEQ ID NO: 2.

The Examiner has additionally rejected Applicants' claims under 35 USC §112, and states,

"...because the specification while being enabling for transgenic *Festuca*, *Lolium*, *Sorghum*, *Zea*, *Triticum*, *Avena* and *Poa* comprising a polynucleotide encoding an FAE enzyme from *Aspergillus niger* of SEQ ID NO: 2, wherein expression of the *Aspergillus* FAE is targeted to the vacuole, ER, golgi apparatus or apoplast does not reasonably provide enablement for any grass plant comprising an FAE 1 encoding polynucleotide or any FAE esterase encoding polynucleotide sequence other than polynucleotide encoding the amino acid of SEQ ID NO: 2."

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Applicants reiterate that the claims recite a polynucleotide encoding an FAE having the amino acid sequence of SEQ ID NO:2. Applicants emphasize that independent claims 3 and 75 are not directed to any plant. The wherein clause of the claims, defines the plants that are covered by said claims.

Applicants assert the claims do comply with both the written description and enablement requirements of section 112, and the rejection of pending claims 3- 12, 14 - 15, 18 -19, 23, 25, 27-33 and 77 - 83 should be withdrawn.

**Rejection under 35 U.S.C. §103.**

The Examiner has rejected claims 3-12, 14, 15, 18, 19, 23, 25, 27 - 33 and 77 - 83 as allegedly obvious over the combination of Michelson, *et al.* (US Pat. No. 6,143,543) in view of Bartolome, *et al.* (Applied and Environmental Microbiology (1997) 63(1):208-212). Applicants respectfully traverse the rejection.

Michelson may teach a polynucleotide encoding a FAEIII from *Aspergillus niger* and general methods of plant transformation, but there is no teaching of an expression cassette as claimed by Applicants which includes not only an FAE encoding polynucleotide operably linked to a promoter but also a targeting sequence wherein expression of FAE in the plant is targeted to certain cell components.

Bartolome has been cited by the Examiner as teaching recombinant expression cassettes which comprise XylD and XylA (xylanases) and that in combination with a FAE from *Aspergillus niger* would more effectively release ferulic acid from the cell walls of a plant than either enzyme alone. Further the Examiner states it would have been obvious at the time of Applicants' invention to modify the invention of Michelson to include an expression cassette comprising a polynucleotide sequence encoding a xylanase operably linked to a promoter.

Applicants respectfully disagree with the Examiner and assert that the Examiner has failed to provide a *prima facie* case of obviousness. A *prima facie* case of obviousness requires the Examiner to cite to a combination of references which (a) suggests or motivates one of skill in the art to modify their teachings to yield the claimed invention, (b) discloses the elements of the claimed invention, and (c) provides a reasonable expectation of success should the claimed invention be carried out. Failure to establish any one of these requirements precludes a finding of a *prima facie* case of obviousness and, without more, entitles Applicants to withdrawal of the rejection of the

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claims in issue. See e.g., *Northern Telecom Inc. v. Datapoint Corp.*, 15 USPQ2d 1321, 1323 (Fed. Cir. 1990); and *In re Dow Chemical Co.*, 837 F.2d 469, 5 USPQ2d 1529 (Fed. Cir. 1988).

Applicants assert that the Michelson et al reference fails to teach, suggest or provide one of ordinary skill in the art motivation to make the instantly claimed invention. In particular there is no teaching directed to inclusion of a targeting sequence in an expression cassette which would specifically target the expression of a FAE in a plant as claimed by Applicants.

The secondary reference of Bartolome may teach that xylanase in combination with a FAE is more effective than either enzyme alone with regard to the release of phenolic dimers, but the reference is directed to the incubation of wheat and barley cell walls with exogenous FAE and xylanase.

As stated in the abstract,

"(We show that incubation of wheat and barley cell walls with ferulic acid esterase from *Aspergillus niger* (FAE-III) or *Pseudomonas fluorescens* (XylD), together with either xylanase I from *Aspergillus niger*, *Trichoderma viride* xylanase or xylanase from *Pseudomonas fluorescens* (XylA), leads to release of the ferulate dimer 5-5'diFA.....)"

There is no teaching of an FAE expression cassette comprising a targeting sequence, which is modified to comprise a polynucleotide encoding a fungal xylanase.

Applicants respectfully assert the references whether taken alone or in combination fail to teach Applicants'claimed invention.

#### **New Claims 84 - 92**

Applicants assert that new independent claim 84, which is directed to a transgenic plant comprising an expression cassette comprising a promoter operably linked to a polynucleotide encoding a ferulic acid esterase and a signal sequence that targets expression of the ferulic acid esterase to the endoplasmic reticulum, vacuole, or apoplast, wherein the transgenic plant is selected from the group consisting of *Festuca*, *Lolium*, *Sorghum*, *Zea*, *Triticum*, *Avena* and *Poa* and said transgenic plant expresses the ferulic acid esterase having ferulic acid esterase activity is patentable over the cited references and further complies with the requirements of section 112. .

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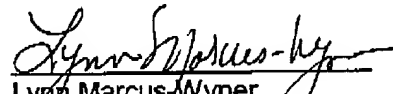
The arguments presented above with respect to the Michelson reference and the Bartolome reference, are relevant to the newly presented claims. It is asserted that the references whether taken alone or in combination do not render claims 84 – 92 unpatentable.

Applicants claim 84 recites a polynucleotide encoding an *Aspergillus* FAE, the FAE is not limited to the FAE having SEQ ID NO:2. While Applicants have only disclosed one FAE1 sequence and have not taught specific conserved sequences required for FAE activity, Applicants believe that one of ordinary skilled in the art using the instant specification would be able to determine other FAE sequences having FAE activity. Indeed the two references cited by the Examiner disclose FAEs. Co-pending application serial number 09/952,445 cited in Applicants' disclosure (now USP 6,368,833 and published as WO 98/14594 on Apr. 9, 1998) discloses not only a purified FAE derived from *Aspergillus niger* but also teaches the identification of homologous genes in filamentous fungi.

In light of the above amendments, as well as the remarks, Applicants believe the pending claims are in condition for allowance and issuance of a formal Notice of Allowance at an early date is respectfully requested. If a telephone conference would expedite prosecution of this application, the Examiner is invited to telephone the undersigned at (650) 846-7620.

Respectfully submitted,

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Lynn Marcus Wyner  
Registration No. 34,869

Genencor International, Inc.  
925 Page Mill Road  
Palo Alto, CA 94304  
Tel: 650-846-7620  
Fax: 650-845-6504